

and later the same origin was attributed to the great Vindhyan system.

In the next place we have the recognition of the Permian glacial epoch. The first description of these beds was published in the *Memoirs* of the Geological Survey in 1856, and their glacial origin proclaimed in 1875 by the late Mr. H. F. Blanford. Though the idea of glaciation in Permian times and in what are now low latitudes has met with great opposition, it has gradually made progress, and it is now generally recognised that the Permian boulder-beds of India, though extending into regions that are now within the tropics, are relics of a bygone glacial epoch. In Africa, the glacial origin of similar beds has been accepted by more than one observer; and in Australia—where the traces of glacial action in the marine Permian or Permo-Carboniferous beds, below the principal coal-measures, was first recognised by a member of the Indian Geological Survey who had been deputed by the Indian Government to study the Australian coal-measures—the existence of glacial action on a large scale has been fully confirmed by workers in that country. In South America, too, it seems that there are similar beds, of apparently the same age, and the evidence of this widespread glacial epoch, more remarkable in many ways even than the post-Tertiary extension of glaciation, must be reckoned with in any speculations attempting to account for the great climatic changes of which the past sediments bear witness.

The labours of the Indian Geological Survey have had important results in geological science in other minor points, too numerous to detail in the limited space of an article, but a mention of the great earthquake of 1897 cannot be omitted. This earthquake was the greatest of which there is historic record, exceeding the great Lisbon earthquake of 1755; but even before this was known the Indian Government had ordered the Survey to make a complete scientific investigation of it. Being the greatest earthquake of which there is historic record, the visible effects were on an unprecedented scale, and its investigation has consequently yielded results which must be taken into account in all future seismological research. Nor must mention be omitted of one of the most recent suggestions, which appears likely to be fruitful of results, made in 1898 by Mr. T. H. Holland, that much of the decomposition, and more especially hydration, of the minerals composing igneous rocks was submarine, and that the undecomposed state of similar rocks, even of perishable minerals like olivine and nepheline, in certain regions, is due to these being ancient land-areas which have not been submerged beneath the sea since a remote geological period.

Such, briefly stated, is the record of the Geological Survey of India, a record which reflects credit on all who have been concerned in the making of it. Yet it must not be forgotten that credit is due also to the Civil Administration of India, which has not only maintained the staff by whom the record has been made, but has given the further pecuniary assistance, modest in amount but steadily continued, which has enabled the Survey to form a museum fully illustrating the geology of India in all its branches, to establish a well-equipped laboratory, and to collect a library which, as a geological working library, is probably unsurpassed by any and equalled by few.

NOTES.

M. DARBOUX, Dean of the Faculty of Sciences of Paris, has been elected permanent secretary of the Paris Academy of Sciences, in succession to the late M. Joseph Bertrand. Prof. J. Willard Gibbs, professor of mathematical physics in Yale University, has been elected a correspondant of the Academy in the section of mechanics. Prof. J. Chatin, assistant professor

of histology at the Sorbonne, has been elected a member of the section of anatomy of the Academy, in succession to the late M. Blanchard.

THE recommendations of the international conference which recently met in London to determine the steps which might usefully be taken for the preservation of wild animals, birds and fish in South Africa, have now been published as a Parliamentary Paper. The zone within which it is proposed to apply the provisions of the Convention is bounded on the north by the 20th parallel of north latitude, on the west by the Atlantic Ocean, on the east by the Red Sea and by the Indian Ocean, on the south by a line following the northern boundary of the German possessions in South-Western Africa, from its western extremity to its junction with the River Zambesi, and thence running along the right bank of that river as far as the Indian Ocean. To preserve the various forms of animal life existing in a wild state within this zone, it is proposed to prohibit the hunting and destruction of certain animals, especially females when accompanied by their young or capable of being otherwise recognised, of which the protection, whether owing to their usefulness or to their rarity and threatened extermination, may be considered necessary by each local government. The establishment, as far as it is possible, of reserves within which it shall be unlawful to hunt, capture or kill any bird or other wild animal except those specially exempted from protection by the local authorities, is recommended, and also of close seasons with a view to facilitate the rearing of young. It is proposed to put export duties on the hides and skins of giraffes, antelopes, zebras, rhinoceroses and hippopotami, on rhinoceroses and antelope horns, and on hippopotamus tusks, and to prohibit the hunting or killing of young elephants. Measures are to be taken for ensuring the protection of the eggs of ostriches, and for the destruction of the eggs of crocodiles, of those of poisonous snakes, and of those of pythons. It is, however, understood that some of the principles laid down may be relaxed, either in order to permit the collection of specimens for museums or zoological gardens, or for any other scientific purpose.

PROF. J. PERRY, F.R.S., has been elected president of the Institution of Electrical Engineers for the session 1900-1901.

MR. BORCHGREVINK, who recently returned from his explorations in the Antarctic, will, it is expected, give a lecture before the Royal Geographical Society on June 18.

THE American Academy of Arts and Sciences has decided to award the Rumford medal to Prof. Carl Barus, of Brown University, for his researches in heat.

WE learn from *Science* that the Committee of Coinage, Weights and Measures of the U.S. House of Representatives has unanimously agreed to report as an amendment to the Sundry Civil Bill the measure establishing a United States Standardising Bureau, referred to in NATURE of May 17 (p. 61).

WE regret that a part of the edition of last week's NATURE appeared without the announcement that the names of Dr. D. Gill, F.R.S., and Dr. T. E. Thorpe, F.R.S., were included in the list of Birthday Honours. The former has been promoted to the rank of K.C.B., and the latter has been created a C.B.

THE third Liverpool expedition for the study of tropical diseases, referred to last week, will start in the first week in July. The members of the expedition are Drs. Durham and Walter Myers. The object of the expedition is to study yellow fever, malaria and dysentery.

AN excursion to Malvern and district has been arranged by the Geologists' Association for Whitsuntide. The director will be Prof. T. T. Groom, and during the stay at Malvern, from Saturday, June 2, to Tuesday, June 5, a number of interesting geological sections and structures will be examined.

A MEETING of the Yorkshire Naturalists' Union will be held at York on Whit-Monday for the investigation of the natural history of Askham Bog, and for the geological investigation of the morainic ridges of Askham and Bilbrough. Askham Bog is one of the very few undrained spots left in the Vale of York; hence the naturalist values it much as the palæontologist values one bone of an extinct animal, for from it he can draw such a true and interesting picture of a stage in the development of the district.

A FISHERIES Exhibition will be held at Salzburg, Austria, on September 2, and the eight following days. The exhibits are divided into nine classes, and include sections for artificial breeding apparatus, preserving methods, tackle, and the literature and statistics of fishing.

THE *Times* announces that the appointment of the commanding officer of the National Antarctic Expedition has been made by the joint committee of the Royal and Royal Geographical Societies. The officer selected is Lieut. Robert F. Scott, now torpedo-lieutenant of the *Majestic*. He has been fifteen years in the Navy, has a record of service of the highest class, and will shortly be promoted to commander. The head of the scientific staff will be Dr. J. W. Gregory, recently appointed professor of geology in the University of Melbourne. Though he has only just entered upon his duties at Melbourne, the authorities have granted him leave of absence to serve with the Antarctic Expedition. He will come to England in October to prepare for his new work.

AN exhibition of photographs, by Dr. P. H. Emerson, will be open at the Royal Photographic Society, 66 Russell Square, W.C., from May 30 until June 30.

By the will of the late Prof. Piazzì Smyth, the executors are instructed to repay to the Government Grant Committee of the Royal Society all of the advances, estimated at 300*l.*, made by the Society to Prof. Smyth for the purchase of scientific instruments after he went to Ripon. The will bequeaths to the Royal Society of Edinburgh the portrait of Prof. Smyth, by Faed, R.S.A., and all his books of original drawings and journals, and his boxes of glass photographs. The residuary estate is to be in trust for certain legatees for life, and subject to their life interest for the Royal Society of Edinburgh if agreeable to receive the same as a trust, whereof the income is to be employed by that Society, first, in printing for a limited free distribution and a small sale to the public, at a cost of about 600*l.*, the spectroscopic MSS. offered by Prof. Smyth to the Government in October 1857, and then to assist or promote every ten or twenty years an exceptional expedition for the study of some particular branch of astronomical spectroscopy in the purer air of some mountain elevation of not less than 6000 feet above the sea-level, as tried and found feasible by him in the first experiment on the Peak of Teneriffe in 1856. If the residuary estate is not accepted by the Royal Society of Edinburgh, it is to be distributed amongst the pecuniary legatees.

LAST week the Royal Horticultural Society held its thirteenth "Temple Show." In every respect, apart from the uncertainty of the weather, the great annual exhibition more than fulfilled the expectation of lovers of flowers and of horticulturists generally. On the other hand, the botanist was greeted by no species that was not already known. The student of evolution might, nevertheless, have made the acquaintance of many new artificial races, and hours might have been spent in examining fresh garden "varieties," produced by hybridisation and cross-breeding. Even when some striking variation has been chanced upon, and "fixed" by careful selection, judicious crossing may be resorted to, in order that further "improvements" may be brought about. To take a case,

Messrs. Laing and Sons showed some begonias, in which the development of a "crest" or tuft of small outgrowths from the petals was very much marked. This appeared sporadically and slightly at first in a plant with flowers of the same colour as those of its parents, but since the establishment of the crested race it has been crossed with others, and now crested petals may be had of many tints. The cactus-flowered zonal pelargonium may be mentioned on account of its vivid colouring and numerous narrow petals. Its rearer, Mr. E. S. Towell, obtained it from the seed of a "semi-double" *Pelargonium*, which he crossed with pollen from many different flowers. Among these was that of *Lychnis chalcidonica*; and Mr. Towell, though not absolutely certain of the fact, considers that the last-named species is the father of his "Fire Dragon." The particular tint of scarlet shown by the petals, the time these persist, and their divided appearance favour this view.

THE Sugar-Beet Committee of the Central Chamber of Agriculture have completed arrangements for a limited number of experiments in the growth of sugar-beet during the forthcoming season, each experimental plot being at least one acre in extent. In all, there will be about thirty-three different experiments, of which twenty-five are situated in England, four in Scotland, and four in Ireland. The English counties in which one or more experiments will be made are Wilts, Hants, Berks, Oxon, Beds, Kent, Suffolk, Hereford, Worcester, Warwick and Lancaster. As previous experiments have, in certain cases, demonstrated the value of sugar-beet for the feeding of live stock (independently of its value for the manufacture of sugar), it has been decided to keep this point specially in view in connection with the experiments of the present year.

AN interesting feature of the Paris Exposition is the elevated moving pavement. The line, which is described in the *Scientific American*, forms a complete circuit, running along the side of the Champ de Mars, the Quai d'Orsay, the Esplanade des Invalides and the Avenue de la Motte-Picquet, the total length of its course being 3500 metres. The platform is supported on an elevated structure, to which access is given from a number of stations situated within the Exposition grounds. The sub-structure supports three platforms, one fixed and two movable, these having a speed of eight and four kilometres per hour. To enable the platform to pass around the curves, the different sections are dovetailed into each other by large circular portions, forming a kind of horizontal hinge. Each of the platforms carries an I-beam running along under the centre; these rest upon a series of rollers placed at intervals, operated by electric motors. Upon the shaft of the motor is mounted a large roller for the high-speed platform and a roller of one-half the diameter for the slow speed. The friction of the platform is sufficient to cause its adhesion to the rollers. The platform was put into operation on April 14, and has proved a great success, as by its means an easy passage through the grounds is afforded, as well as a series of interesting views. The tour is made in twenty-six or fifty-two minutes.

PARTICULARS of the short electric line—about 5000 feet in length—between Earl's Court and High Street, Kensington, which has just been opened on the Metropolitan District Railway, are given in the current number of the *Electrician*. The engineers, Sir John Wolfe Barry and Sir W. H. Preece, were required to equip this line electrically without any interference with the permanent way, without any interference with the running of the ordinary train service, and without allowing any electric current to pass through the permanent way or the sub-soil, lest such should interfere with the signalling arrangements of the line. In accordance with these stringent regulations, it became necessary to adopt an insulated system throughout, and

to do the whole of the construction work in the few midnight hours when the trains were not running. The system may be termed a four-rail system. It includes the two ordinary track rails, which are not used for any electrical purpose whatever, and two electrical rail conductors placed on either side outside the track. A special type of train has been designed for the line, the design being such as to adapt it specially to the experimental conditions. There is no separate locomotive, the train being worked in block, and a motor carriage being placed at either end. Only one motor carriage, however, is used at a time—viz. that one in the front in the direction in which the train is moving. This arrangement, while duplicating the amount of electric motor plant, is convenient, as it obviates shunting the motor carriage. It is intended to carry out a series of careful experiments on electric traction upon this line, and for this purpose a dynamometer car will sometimes be attached to the train. Already certain experiments have been made. In his evidence before the Select Committee of the House of Commons considering the Manchester-Liverpool Express Railway, Sir William Preece recently stated that the train, fully loaded, had started on the very difficult gradient of 1 in 43—a feat which an ordinary steam locomotive was unable to perform when hauling a similar load. Moreover, in a tug-of-war between the electric train and a steam locomotive, the electric train readily overcame the steam engine.

It has been said that every person is mentally a little unbalanced, and that education from this point of view is simply the attempt to secure and maintain mental equilibrium, which, however, is never actually attained. Lapses of thought, inadvertencies in expression, and other slips in speaking or writing (*lapsus linguae* and *lapsus calami*) are thus of interest to the psychologist as useful guides to the understanding of mental processes. Every one has experienced unaccountable lapses of this kind, and the lapse often comes as a surprise to the speaker or writer himself. During a lecture, a professor inadvertently referred to the "tropic of Cancercorn," intending to say "the tropics of Capricorn and of Cancer." Many similar instances might be cited, for example, the man who was going for a walk to "get a breash of freth air," the person who inquired for the "portar and mestle," and another who said "the pastor cut the shermon sort." A physicist is recorded to have said that he feared he should "get the instrument out of needle," when he intended to say he feared he would "get the instrument out of level and deflect the needle." This is curious, but it is not so amusing as the order of "beggs and acon" for breakfast, or the remark of a nervous churchman to a stranger in his seat, "Excuse me, but you are occupying my pie." Mr. H. Heath Bowden has made a detailed study of similar mental lapses, both oral and graphic, and his results are described in a monograph of the *Psychological Review*. It is suggested that the aberrations dealt with are due to incipient aphasia or agraphia, and the similarity between them is held to show that our ordinary experience borders at every point on what is called the abnormal or pathological condition.

FOR some time past peat has been largely used in this country as litter for stables in the place of straw. This material is now likely to have a much more extended use, and the peat bogs of this and other countries made to assume a value never before realised. For the past twelve years Herr Zschörner, of Vienna, has been investigating the properties of peat, and has shown its possibilities. In the Vienna Exhibition of last year was a building in which everything, from the carpets on the floor to the curtains on the windows, and the paper on the walls, had all been made from peat. Herr Zschörner's investigations have shown that, although the fibres of the remains of the reeds and grasses of which peat is composed have become

altered in their physical and chemical character, yet they have not suffered any anatomical change; and while nothing capable of fermentation or decay is left, the fibrous structure remains intact; that they are very durable, elastic, good non-conductors of heat and non-combustible. Fabrics woven from them are found to have the toughness of linen with the warmth of wool. There is no textile fabric that cannot be woven from these fibres. Blankets and other coverings used for horses and cattle have been found in use to excel in warmth and cleanliness. The unspun fibre is found to be a good substitute for absorbent cottons possessing strong antiseptic properties. Paper of several qualities has been made, and the uses to which peat fibre has already been applied indicate possibilities that may render the peat bogs of Ireland a valuable addition to the resources of that country, and give full occupation to the inhabitants of the "congested" districts.

THE *Rendiconto* of the Naples Academy for March and April contains a complete list of the mathematical works of the late Prof. Beltrami.

In the *Bulletin de la Classe des Sciences* of the Belgian Academy, M. Vandenberghe continues his researches on the dissociation of substances in solution. The author, by new experiments conducted with the use of solvents belonging to the same homologous series, establishes the conclusion that the influence exerted on the decomposition of molecular associations by the solvent does not materially influence the effects due to elevation of temperature.

A PRELIMINARY note on the magnetic observations made during the *Belgica* Antarctic expedition is given by M. G. Lecoq in the *Bulletin de la Classe des Sciences* (Brussels). For the measurements of declination Neumayer's apparatus was used, the declination being the difference between the magnetic azimuth of a star and the true azimuth calculated from the local time. The Neumayer apparatus was also found far more suitable than the theodolite for measuring the horizontal component, the instability of the theodolite as its feet began to sink into the ice rendering observations made with it of little value. In determining the inclination the great sensitiveness of Gambey's compass could not be utilised regularly on account of the ice-movements, and here again Neumayer's apparatus proved the most serviceable. The paper consists chiefly of a table of the recorded observations.

IN his Wilde Lecture, published in the *Manchester Memoirs*, 1899, No. 5, Lord Rayleigh discusses the mechanical principles and possibilities of flight, both natural and artificial. The problem of the sailing bird is treated from the three alternative points of view, which attribute its source of energy to upward currents, variation of wind-velocity with the altitude and pulsating gusts of wind. Lord Rayleigh then considers the law of dependance of the aerial resistance of a plane surface on its obliquity, and describes experimental methods whereby the resistances at different obliquities may be compared by an "astatic" arrangement, in which pairs of vanes are so adjusted that the moments of the oppositely turned vanes balance each other. In connection with the expenditure of power required to support a given weight, Lord Rayleigh has calculated that, in order for a man to support himself by a *vertical* screw by working at the power an average man can maintain for eight hours a day, he would require a screw ninety metres in diameter, and in this estimate no account has been taken of the weight of the mechanism or of frictional losses. In conclusion, the effects of flapping wings are briefly discussed.

A FURTHER addition to Mr. H. C. Russell's interesting current papers (No. 4), containing the tracks of 124 bottles received during a year ending with September last, has been

published. The comparatively large number of bottles received appears to be owing to the prevalence of southerly winds; the north-west winds being found to alter the direction of the drifting bottles, so that they pass to the south of Australia. The suggestion made in the previous paper that bottles thrown over on the east coast drifted first to the east in Tasman Sea, and then northwards until they reached the great current from the east, which passes south of New Caledonia, is supported in a remarkable way by the drift of the *Perthshire* after she was disabled in the Tasman Sea; her general direction for 640 miles was N.E. by N., at an average daily rate of 13.6 miles. Towards the end of the drift she travelled rapidly to the west. Two bottles floated near Cape Horn came over to Australia at the daily rates of 12.2 and 9.5 miles respectively. There are also some very interesting bottle tracks in the North Atlantic Ocean. One of these, floated in the Gulf of Mexico, made a run of 6300 miles in a south-easterly direction—the longest hitherto recorded in that ocean by Mr. Russell. The proportion of bottles received to those thrown overboard appears to be very disappointing; out of 48 bottles thrown from ss. *Gulf of Bothnia*, to take an extreme case, only one was received.

THE resolutions passed at the International Congress for Marine Research held at Stockholm last summer are published *in extenso* in the April number of the *Scottish Geographical Magazine*. An important feature in these resolutions is the recognition that the primary object of the investigations recommended to be undertaken is the improvement and promotion of fisheries by means of international agreements.

IN *Appleton's Popular Science Monthly* for May, Prof. E. S. Morse gives a full account of the observations made by himself many years ago as to the manner in which the larval insect known as the "cuckoo-spit" forms the mass of froth in which it is concealed. If the insect be cleared from the mass of froth and allowed to settle upon some succulent plant-stem, it will soon thrust its piercing organs through the outer layers and commence sucking the juices. After a short time a clear fluid exudes from the abdomen, and after flowing over the body eventually fills up the spaces between the latter, the legs and the stem, so that the entire creature is soon totally enveloped. For about half an hour the insect will remain quiescent in this condition, when it suddenly begins to "blow bubbles" by turning its tail out of the fluid, opening the terminal segment, which appears like claspers, and then bending down the tail into the fluid with an attached air-bubble, which is instantly allowed to escape. These movements are repeated at the rate of 70 or 80 a minute till the entire envelope of fluid is converted into the mass of froth with which we are all familiar.

Bulletin No. 23 of the Division of Entomology of the U.S. Department of Agriculture is devoted to a series of articles, by Mr. F. H. Chittenden, dealing with some of the insects injurious to garden crops. Sixteen different species of such pests are described, with the devastation they cause. Out of these, the most generally interesting is the invasion of the "fall army-worm" in 1899. This caterpillar (*Laphygma frugiperia*) derives its name from the circumstance that, unlike the true "army-worm," it is seldom observed, except perhaps in the most Southern States, to travel in large hosts until the autumn, or, at least, before August. During 1899 these caterpillars appeared in vast swarms over a large area of the States, where they inflicted much damage on crops of various kinds. Properly speaking, the "fall army-worm" is a grass-feeder, but when it makes its appearance in such numbers as to consume all accessible pasture in the neighbourhood, as was the case last season, it turns its attention to gardens, orchards and greenhouses. The crops affected last year, in addition to grass and clover, included rice, maize, wheat, oats, cabbage, beet, peas, turnips and

even tobacco. Unfortunately, the "fall army-worm" differs from the true "army-worm" in that its hosts may reappear the year after a visitation; and destructive measures, such as poisoning by kerosene or arsenic, are accordingly essential.

WE have received the *Proceedings* of the South London Entomological and Natural History Society for 1899, which includes the President's address and several original communications on entomological subjects.

THE latest issue of the *Natural History Transactions* of Northumberland, Durham, &c., contains a catalogue of the unique and unrivalled collection of British birds presented in 1883 to the trustees of the Natural History Society of those counties by the late John Hancock. The catalogue has been drawn up by Mr. J. Howse.

THERE are already several excellent editions of Gilbert White's "Selborne," but a welcome will be extended to the splendid volumes, the first of which has just been published by Mr. S. T. Freemantle. In this edition we shall have in two volumes a superb "Natural History and Antiquities of Selborne, and a Garden Calendar," edited by Dr. R. Bowdler Sharpe, with an introduction to the Garden Calendar by Dean Hole, and numerous plates and other illustrations.

"LA SPÉLÉOLOGIE" is the title of a little handbook by M. E. A. Martel on the science of caverns. It belongs to the "Scientia" series, published by MM. Carré et Naud (Paris, 1900; pp. 126). The author gives an account of the origin of fissures and caverns, of the action of subterranean waters and all matters connected with them. He deals also with the phenomena of ice-caves (*glacières*), and again with the relations between rock cavities and metalliferous deposits. The various prehistoric and historic remains found in caverns are somewhat briefly dealt with; and finally the author discourses on the plants and animals found living in subterranean regions.

MR. W. ENGELMANN, of Leipzig, has just commenced the publication of an elaborate work, by Prof. W. Wundt, entitled "Völkerpsychologie: Eine Untersuchung der Entwicklungsgesetze von Sprache, Mythos, und Sitte." The work will be completed in three volumes—the first dealing with language as the expression of the emotions by signs and speech, the second with myths and religions, and the third with ceremonies and customs. Each volume will be complete in itself, and will be separately indexed. The second (and concluding) part of the first volume will be published in the autumn of this year, and will then be reviewed with the part which has just appeared.

DR. ROBERT MUNRO'S "Rambles and Studies in Bosnia-Herzegovina and Dalmatia" (Blackwood) is not only an excellent book of travel, but a very valuable contribution to archaeological literature. An appreciative notice of the work appeared in these columns four years ago (vol. liv. p. 78), and we have now to announce the publication of a second, revised and enlarged edition. An account is given of the proceedings of the Congress of Archaeologists and Anthropologists held at Sarajevo in August 1894, and as the Government of Bosnia-Herzegovina have departed from their original intention to publish a report of the congress, Dr. Munro's volume has the distinction of being the only record, in book form, of the important problems which were considered. A number of additions have been made to the original volume, and a much-wanted index has been supplied.

THE second and third parts of the second volume of the unique "Encyklopädie der mathematischen Wissenschaften" in course of publication by the firm of B. G. Teubner, Leipzig, have just been issued. The scope of this great undertaking is

so extensive that several years must elapse before the work is completed. There will be seven volumes in all, having the following subjects and editors:—Arithmetic and algebra, Prof. W. F. Meyer; analysis, Prof. H. Burkhardt; geometry, Prof. Meyer; mechanics, Prof. F. Klein; physics, Prof. A. Sommerfeld; geodesy and geophysics, Prof. E. Wiechert; astronomy (under arrangement); history, philosophy, and didactic questions, Prof. Meyer. The work is published under the auspices of the Munich and Vienna Academies of Science, and the Göttingen Society of Sciences, and no mathematical library will be complete without it.

SIR JOHN LUBBOCK'S book on "The Scenery of Switzerland, and the causes to which it is due" has been translated into Italian by Dr. L. Scotti, and is published by Signor U. Hoepli, of Milan, as "Le Bellezze della Svizzera, Descrizione del Paesaggio e sue Cause geologiche." The first English edition was noticed in NATURE of September 10, 1896 (vol. liv. p. 439); the translation is from the third edition, published in 1898.

THE use of acetylene for lighting rooms upon a commercial scale renders its purification from sulphuretted and phosphuretted hydrogen imperative, on account of the injurious effects of the products of combustion of these impurities in a confined space. Numerous substances have been put forward by different inventors as effecting the desired purification, among which may be mentioned ferric chloride, chromium sulphate, petroleum, benzene, chromic acid, bleaching powder, and cuprous chloride. The ideal purifier should remove the impurities as completely as possible, should not absorb acetylene itself, and should not communicate any objectionable properties to the purified gas. The current number of the *Moniteur Scientifique* contains abstracts of numerous papers upon this subject. From these it would appear that solutions of metallic salts do not wholly remove the impurities, chromic acid and chloride of lime solutions being the only substances that effect a complete purification, and of these the former is preferable, as with the latter explosions have occurred, probably owing to the formation of chloro-acetylene.

THE additions to the Zoological Society's Gardens during the past week include a Diana Monkey (*Cercopithecus diana*) from West Africa, a Common Squirrel (*Sciurus vulgaris*), British, presented by Mrs. Morris; a Common Paradoxure (*Paradoxurus niger*) from Java, presented by Mr. E. E. Hewens; a Boddaert's Snake (*Drymobius boddaerti*), a Chequered Elaps (*Elaps lemniscatus*), a Rat-tailed Opossum (*Didelphys nudicaudata*) from Trinidad, presented by Mr. Leon Bernstein; a Summer Snake (*Contia oestiva*), a Mexican Snake (*Coluber melanoleucus*), six Menobranches (*Necturus maculatus*), five American Green Frogs (*Rana halecina*) from North America, deposited.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN JUNE.

- June 2. 8h. 33m. to 9h. 35m. Moon occults κ Cancri (mag. 5.0).
 4. 9h. 49m. to 10h. 45m. Transit of Jupiter's Satellite III. (Ganymede).
 7. 9h. 58m. to 10h. 55m. Moon occults the star D.M. - 10°, 3570 (mag. 6.0).
 11. 8h. Jupiter in conjunction with moon. Jupiter 1° 29' North.
 11. 11h. 23m. to 12h. 43m. Transit of Jupiter's Satellite III. (Ganymede).
 12. Partial eclipse of the moon.
 13h. 16.2m. First contact with penumbra.
 15h. 24.2m. First contact with shadow.
 15h. 27.6m. Middle of the eclipse.
 15h. 31.0m. Last contact with the shadow.

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June 12. 17h. 39.0m. Last contact with the penumbra.

It will be a very small eclipse, the proportion of the moon's surface covered by the earth's shadow being equal to only one-thousandth part. The fainter outlying shadow will, however, cover a large region, but will be only faintly discernible.

13. 7h. Mercury in conjunction with ϵ Geminorum. Mercury, 0° 3' South.
 13. 9h. 40m. to 10h. 52m. Moon occults the planet Saturn.
 15. Venus. Illuminated portion of disc, 0.144. Mars, 0.962.
 16. 8h. 48m. Jupiter's Satellite IV. (Callisto) in conjunction south of planet.
 19. Saturn. Polar semi-diameter, 17" 0. Outer minor axis of outer ring, 18" 87.
 23. 5h. Saturn in opposition to sun.

SEARCH EPHEMERIS FOR EROS.—The following is continued from the ephemeris by J. B. Westhaver (*Astronomical Journal*, No. 479, vol. xx. p. 185).

| | | Ephemeris for 12h. Greenwich Mean Time. | | | | |
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| 10 | ... | 11 | 11.9 | ... | ... | 6 42 6 |
| 12 | ... | 14 | 42.5 | ... | ... | 7 17 24 |
| 14 | ... | 18 | 12.4 | ... | ... | 7 52 51 |
| 16 | ... | 21 | 41.7 | ... | ... | 8 28 27 |
| 18 | ... | 25 | 10.3 | ... | ... | 9 4 12 |
| 20 | ... | 28 | 38.1 | ... | ... | 9 40 5 |
| 22 | ... | 32 | 5.3 | ... | ... | 10 16 8 |
| 24 | ... | 35 | 31.8 | ... | ... | 10 52 19 |
| 26 | ... | 38 | 57.5 | ... | ... | 11 28 39 |
| 28 | ... | 42 | 22.4 | ... | ... | 12 5 8 |
| 30 | ... | 45 | 46.6 | ... | ... | 12 41 47 |
| July 2 | ... | 49 | 10.0 | ... | ... | 13 18 34 |

Prof. Howe is reported to have discovered the planet in the constellation Aries.

OXFORD UNIVERSITY OBSERVATORY.—In the twenty-fifth annual report of the Savilian professor at Oxford, Prof. H. H. Turner briefly reviews the history of the institution. The late Prof. Pritchard, in 1873, successfully appealed to the University for facilities to institute the means of carrying on astronomical research, but the plans originally projected being modified by the presentation of Dr. De la Rue's instruments, the building was not finished until 1875. However, notwithstanding his advanced age, Prof. Pritchard carried out before his death two important researches, the *Uranometria Nova Oxoniensis*, and the determination of stellar parallaxes; and initiated a third, the share of the Observatory in the International Astrographic Chart.

During the six years of Prof. Turner's directorship the energies of the Observatory have been chiefly directed to carrying out, as expeditiously and economically as is consistent with the necessary accuracy, this great work of fundamental astronomy. One or two more years will be required to complete it, but the work is at present as well advanced as at any of the other eighteen observatories which are collaborating. In addition, the Observatory has been utilised as an educational institution for the benefit of the students of the University.

For the Astrographic Catalogue, 736 plates are now measured, and 705 completely reduced, out of the 1180 falling to the share of the Observatory. Measurements have been made on a plate supplied by Prof. E. C. Pickering to determine the optical distortion of a photographic doublet. A preliminary discussion of these measures indicates a distortion varying as the cube of the distance from the centre of the plate; this somewhat surprising result, if confirmed, will enable the reduction of photographs of star fields of wide angle to be made with great accuracy.

ROUSDON OBSERVATORY, DEVON.—Sir C. E. Peek sends us another of his pamphlets (No. 6), containing the detailed particulars of the observations of variable stars during the past decade. The observations of T Cassiopeiae extend over the ten years 1889–1898, and those of R Cassiopeiae from 1887–1898. At the end of the observation the light curves of the two stars are shown.